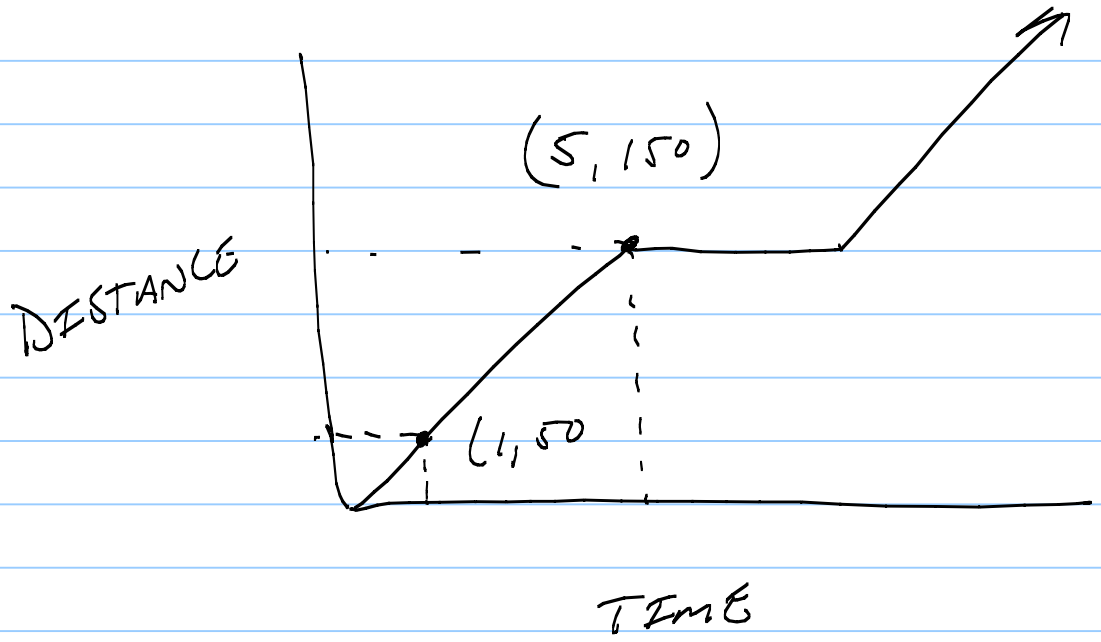
INSTANTANEOUS RATES OF CHANGE

Note Title 2/25/2014

IE



WHAT IS THE AVERAGE VELOCITY BETWEEN

1 SEC AND 5 SECS?

$$\overline{S} = \frac{150 - 50}{5 - 1}$$

$$\bar{S} = \frac{100}{4}$$

$$= 25 \text{ m/s}$$

IN GENERAL, THE AVERAGE VELOCITY FOR A POSITION FUNCTION $y = x(t)$

$$\bar{V} = \frac{x(t_2) - x(t_1)}{t_2 - t_1}$$

- THE INSTANTANEOUS VELOCITY

$$V(t) = \lim_{h \to 0} \frac{x(t+h) - x(t)}{h}$$

$$V(t) = x'(t)$$

IE MR. MORGAN THROWS A CALCULUS STUDENT OUT A WINDOW. HIS POSITION WITH RESPECT TO THE GROUND IS $x(t) = 4.8 + 1.3t - 4.9t^2$

FIND AVG. VELOCITY BETWEEN $t = .23$ SEC AND $t = 0.50$ SEC.

SOLN $x(.23) = 4.8 + 1.3(.23) - 4.9(.23)^2$

$$= 4.84$$

$$x(.50) = 4.8 + 1.3(0.50) - 4.9(0.50)^2$$

$$= 4.23$$

$$\bar{v} = \frac{4.23 - 4.84}{0.50 - 0.23}$$

$$\bar{v} = -2.26 \text{ m/s}$$

$x'(t)$ AT 0.50 SEC.

$$x(t) = 4.8 + 1.3t - 4.9t^2$$

$$x'(t) = 0 + 1.3 - 9.8t$$

$x'(.50) = 1.3 - 9.8(.50)$

$x'(50) = -3.6 \quad m/s$

$V(t)$ = FUNCTION

$V'(t)$ = VELOCITY

$V''(t)$ = ACCELERATION

$V'''(t)$ = JERK

HW Pg 143 # 1, 3, 5, 6, 8, 12, 17